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USE AND SIGNIFICANCE OF PALMS (ARECACEAE) AMONG THE YANOMAMÏ IN SOUTHERN VENEZUELA

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ABSTRACT.—Palms play an important role in the subsistence activities and material culture of virtually all indigenous societies in the Amazon. They are widely distributed throughout the forests of southernmost Venezuela, where they are represented by over 60 species from 21 different genera. The present work focuses on the importance of palms among the Yanomamï Amerindians of the upper Orinoco region. The material presented in this article is derived from ethnobotanical fieldwork in several Yanomamï villages between 1997 and 2002, as well as from a complete revision of the relevant ethnographic and ethnobotanical literature. It is our aim to present a comprehensive account of the recognition, ethnotaxonomy, use, as well as economic and symbolic importance of palms among the southern Yanomamï groups in Venezuela, giving also some reference to comparable data obtained from Yanomamï groups in Brazil. Furthermore, observed differences in the use of palms because of acculturation and the resulting changing cultural context are described and discussed. The indigenous names and the economic significance of 37 palm species from 16 different genera are presented.

Key words: Yanomami, palms, Arecaceae, Venezuela, Amazonas, ethnobotany.

RESUMEN.—Es bien conocido que las palmas juegan un importante papel en las actividades de subsistencia y en la cultura material de una gran cantidad de sociedades indígenas en la región amazonica. Las palmas se tienen una amplia distribución en los bosques del extremo sur de Venezuela, donde están representadas por más de 60 especies, agrupadas en 21 géneros. El presente trabajo se centra en la importancia de las palmas entre los Yanomamï de la región del Alto Orinoco. El material expuesto en este artículo se deriva del trabajo etnobotánico realizado en diferentes poblados Yanomamï entre 1997 y 1999, así como de una completa revisión de la bibliografía etnográfica y etnobotánica más relevante. Nuestro objectivo es presentar un informe global sobre el reconocimiento, etnotaxonomía y uso, así como la importancia económica y simbólica de las palmas entre los Yanomamï en Venezuela, incluyendo algunas referencias a datos comparables procedentes de la información ya recabada entre grupos Yanomamï del Brasil. Además, se describen y discuten diferencias observadas en cuanto al uso de las palmas, debidas a la aculturación y sus consecuentes cambios. Se presentan los nombres étnicos y la importancia económica de 37 especies de palmas, agrupadas en 16 géneros.

RÉSUMÉ.—Les palmiers jouent un rôle important dans la subsistance et la cul-

ture matérielle de pratiquement toutes les populations indigènes de l'Amazonie. On en trouve beaucoup dans toutes les forêts du sud du Venezuela où ils comptent plus de 60 espèces et de 21 genres. Cette étude examine l'importance des palmiers chez les indiens Yanomamì, amérindiens de la région du Haut Orénoque. Nos informations viennent de deux sources: les donées recueillies lors d'activités ethnobotaniques sur le terrain effectuées entres 1997 et 2002 dans plusieurs villages yanomami, et une revue exhaustive de la littérature ethnobotanique et ethnographique pertinente. Notre but est d'offrir un compt rendu détaillé de la perception, ethnotaxonomie, et de l'exploitation des palmiers par les groupes yanomami du sud du Venezuela. Nous expliquons également leur importance symbolique et économique et nous faisons quelques références aux données comparables recueillies parmi les groupes yanomami du Brésil. De plus, cet article décrit les différentes utilisations de palmiers qui résultent de l'acculturation et la modification du contexte culturel qui s'ensuit. Pour terminer, nous expliquons l'importance économique de 37 espèces de palmiers (16 differents genres), et nous listons leurs noms indigènes.

INTRODUCTION

Palms are an important economic resource in the Estado Amazonas (Amazon State) of Venezuela (see Guánchez and Romero 1998; Narváez and Stauffer 1999; Narváez et al. 2000). The Arecaceae remain among the most significant plant families with respect to cultural importance and economic value among all ethnic groups of the Amazon (Balick and Beck 1990; Kahn and de Granville 1992). This is also true for the Yanomamï communities in Venezuela. Despite numerous publications about this ethnic group, a comprehensive ethnobotanical study about the use and significance of palms among the Yanomamï is lacking. Contrary to earlier observations (Anderson 1978), the Yanomamï in Venezuela use palms extensively; the use of palms also appears to be more important than that of other plant families. Palms have entered almost every aspect of life among the Yanomamï, from subsistence to material culture, medicines, and rituals.

Early ethnographic investigations among the Yanomamï, such as those by Vinci (1961), Zerries and Schuster (1964, 1974), Polykrates (1967), Knobloch (1970), Montgomery (1970), Cocco (1973), and Anderson (1978) provided the first vernacular names of palms in the Yanomamï language. Between 1954 and 1955, Zerries and Schuster carried out the first comprehensive ethnographic work among the Yanomamï in Venezuela and published several names and uses of palms (Zerries and Schuster 1974), but no botanical specimens were collected. This initial study was followed by a series of detailed ethnographic descriptions about different linguistic subgroups by Polykrates (1967), Chagnon (1968, 1992), Lizot (1972, 1980), Becher (1974), and Peters (1998). Anderson (1978) published the names and uses of twenty palm species among a particular Yanomamï community, the Xirianateri (Shirianatheri) of the Toototobi area in Brazil and he collected botanical specimens for each palm mentioned. Today, Anderson's study about palms still represents the most complete study from the Brazilian side. Fuentes (1980) provided new ethnobotanical data about the Yanomamï of the Ocamo region in Venezuela, including information about 16 palm species. More recently, Milliken and Albert (1999) published their comprehensive ethnobotanical work

derived from two Yanomamï communities of the Demini region in Brazil, including botanical and ethnographic information for about 17 palm species. At present, a detailed comparative study about palms among the Yanomamï is lacking.

During the first author's visits to the Yanomamï villages around Ocamo, Platanal, as well as Hasupïwei, Irokai and Mokaritha in the Sierra Unturán, it became evident that palms are a significant economic and cultural resource. We were therefore prompted to study the significance of palms from a comparative point of view. In this paper we present new information about the ethnotaxonomy and use of palms in Yanomamï culture.

METHODOLOGY

Most of the information for this study was collected during two longer periods of fieldwork by the first author in July–October 1998 and January–February 1999. During that time six Yanomamï villages were visited: Ocamo, Aratha, Mahekotho, Hasupïwei, Irokai, and Mokaritha. All of the communities belong to the linguistic subgroup Yanomamï. Field observations also were incorporated from other shorter visits by the first author to several other villages along the Mavaca and Siapa in 1992 and Ocamo and Orinoco in 1997 and 1999. The content of this article was finally discussed again in the villages Shotemi, Hokotopïwei, Hasupïwei and Ashitowë in January–March 2002. Informal and open structured interviews were conducted in the communities Hasupïwei, Irokai and Mokaritha. Determinations of the palms were made in situ by two informants. Palm material was further taken to the village and consensus on the information given by our main informants was agreed upon by at least four male and two female representatives of the community. Plant material always consisted of leaf material and the infructescence. Use reports were gathered in the villages. Unclear use reports were not considered for this study. Data obtained during trekking was corroborated by at least three informants. Collections and pictures of the most useful palms were made in the Sierra Unturán and lower Sierra Parima. Voucher specimens were prepared as described previously (Stauffer 2000) and deposited at VEN and partly also at MYF. The second author further collected botanical specimens as well as ethnobotanical information in the Mavaca area in 1999 and also revised collections at the VEN, NY, US, MYF, TVAF, PORT, MER, GUYN and CAR herbaria[1] (Stauffer 2000).

The artificial scale of importance used for this study (see Table 1) is based on the use reports collected in the different villages. Each use report contains information about the specific use of a palm species, including information about the frequency of use. The scale is based on 218 use report entries.

THE YANOMAMÏ IN VENEZUELA

The Amazonas State in Venezuela occupies over 180,000 km^2 (Figure 1). Almost 90% of its total area is occupied by rain forests and about 45% of it is protected by the Venezuelan government as National Parks and Monuments or as upper Orinoco-Casiquiare Biosphere Reserve (Huber 1995). The territory inhabited by indigenous people is further protected by law through the *Dirección de*

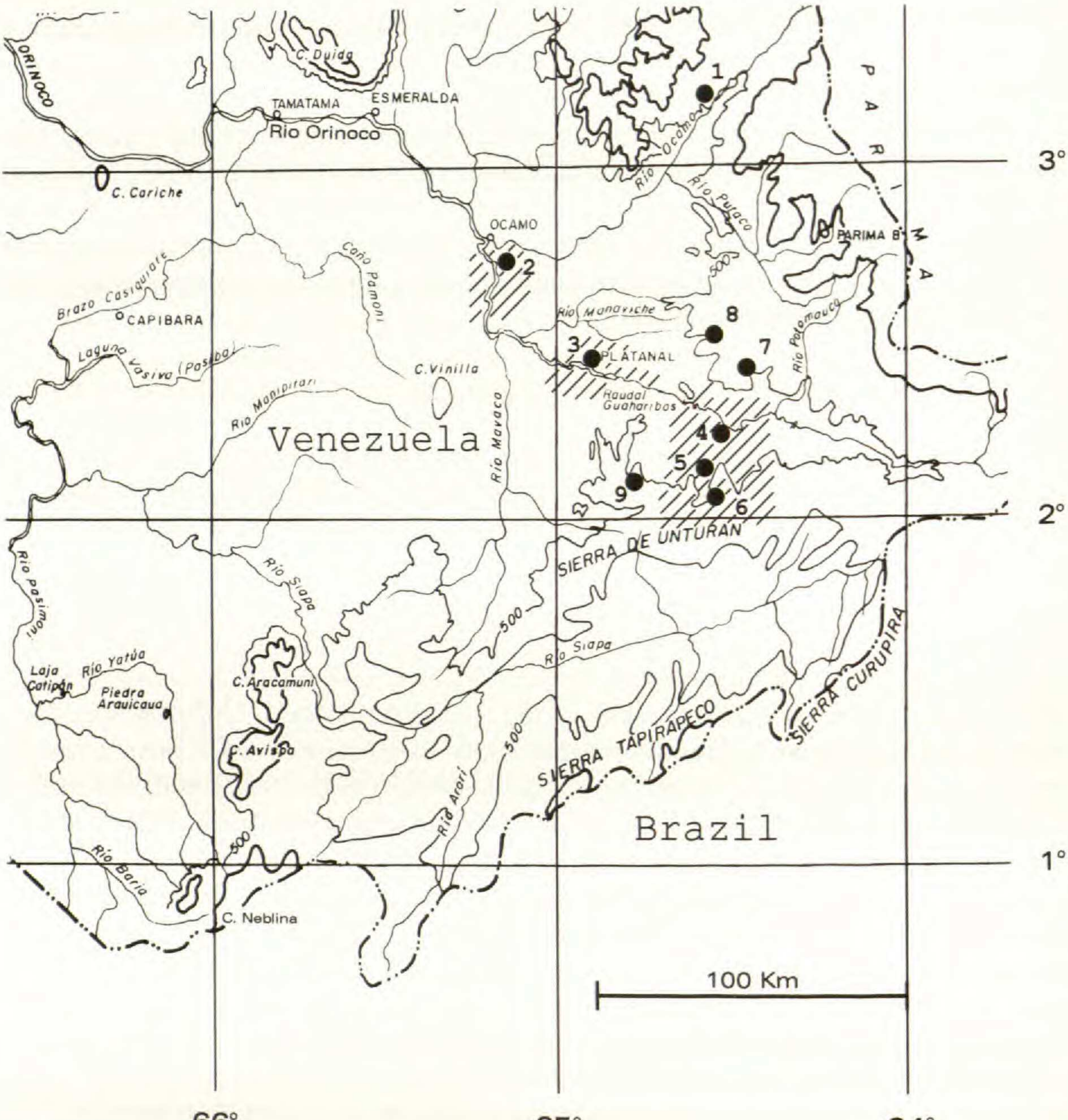

FIGURE 1.—Area of fieldwork. The villages where the ethnobotanical study took place: 1) Aratha; 2) Ocamo; 3) Platanal (Mahekoto); 4) Hasupïwei; 5) Irokai; 6) Mokaritha; 7) Hok-otopïwei; 8) Shotemi; 9) Ashitowë. Hatched area shows where most of the palms were recorded.

Asuntos Indígenas (D.A.I). The total population of Amazonas State exceeds 100,000 inhabitants, 50% of whom are local Amerindians (*indígenas*). The Amerindians belong to thirteen ethnic groups, the biggest of which is represented by the Yanomami (also Yanomamo, Waika, Guaharibo or Shiriana). Of a total indigenous population estimated at around 17,000 people, the Venezuelan Yanomami at present number about 11,000 (Gertsch 2002). The ethnic group Yanomami is currently subdivided into four linguistic groups (Migliazza 1972): the Sanïma, the Nïnam, the Yanomam, and the central Yanomamï. The Sanïma live to the north of Brazil, in the upper Auaris and Erebata region as well as in the Estado Bolívar in Venezuela; the Nïnam live in the upper Paragua region, north to the Sierra Parima

and around the Apiau and Mucajai rivers; the Yanomam live in the watershed of the Catrimani and Demini rivers, as well as in the Venezuelan-Brazilian Sierra Parima. The Yanomamï, which is the group investigated here, inhabit the upper Orinoco and its tributaries Ocamo, Mavaca, and Siapa, the western communities of the lower Sierra Parima and the southern communities in the Sierra Unturán and Sierra Tapirapecó being the most isolated. It is generally accepted that the ethnic epicenter is the Sierra Parima from where migration might have started (Smole 1976). For simplicity we here always refer to the ethnic description when using the term Yanomamï, if not otherwise stated.

Settlement.—The Yanomamï live in communities of 20 to 200 individuals in provisional shelters (***yahi***) or circular communal houses (***shapono*** or ***yano***). Each roundhouse has an open space in the middle, which represents a common area where community affairs are discussed and feasts are held (Figure 2). The actual living area is thatched with palm leaves and is situated on the outside of the roundhouse with just one fence-like wall at the back. The ***shapono*** is divided into sections, each representing a social nucleus, usually a family or a clan. Location and size of a Yanomamï community strongly depends on economic alliances with other communities. There are many examples where communities split up because of political conflicts or even warfare between clans or families (Chagnon 1997; Ferguson 1995). Probably more than half of the approximately 110 communities in Venezuela are still semi-nomadic and move their village every three to seven years. The groups then move between 5 and 80 km further on (Lizot 1971) and so create a new territory. This migration activity is an important custom in the sustainable use of the resources. Generally between February and April and between August and October the Yanomamï community goes for long treks (***wayumi***), and it is common to find that whole villages are abandoned for two or three months.

Subsistence.—The Yanomamï are not only hunters and gatherers, but also shifting cultivators (Lizot 1978). About 60% of their food originates from cultivated plants. Each settlement has one or more garden areas (***hikari***) outside the ***shapono***. The garden is split up into sections, each area being kept by a different family or clan. Shifting cultivation is a key factor in subsistence activities, which are segmented into gender specific roles. Among the most important crops are *Musa paradisiaca* L. (***kurata*** and ***tate***), *Bactris gasipaes* Kunth (***rasha kë si***), *Nicotiana tabacum* L. (***pêê nahe***), *Xanthosoma* spp. (e.g., ***ohina***), *Manihot esculenta* Crantz., and *Zea mays* L. (***yono***). In addition to the wild palm fruits, the Yanomamï collect other edible wild plant products, such as the fruits of *Clathrotropis* spp. (***wapu kohi***), *Bertholletia excelsa* Humb.& Bonpl. (***hawari kohi***), and *Micrandra* spp. (***momo kehi***). The traditional world of the central and southern Yanomamï is divided up into village (***yahi***), garden (***hikari***) and forests (***urihi***). The use of palms is not restricted to any of these segments.

During the treks the whole community may explore remote areas, which can be over 100 km away from their village. While the men hunt game and collect fruits, honey and small animals, the women collect a variety of wild plant and fungal products and also catch smaller animals, such as river crabs (***oko***) (Pseudothelphusidae and Trichotactylidae), and fish (***yuri***). The consumption of palm

FIGURE 2.—Communal roundhouse with palm-thatched roof (*Geonoma* spp. and *Attalea* spp.) in Hasupïwei.

products is an important tradition for subsistence during the treks. During migration or trekking activities the Yanomamï explore new habitats, which are sometimes distinct ecosystems with different plant species composition.

HOW PALMS ARE CLASSIFIED

The Denominator **Si** *as Generic Label for Palms.*—We could not find a family-specific classification system for the Arecaceae among the Yanomamï communities visited in Venezuela. According to our informants, palms can always be put into the category ***si***. The nominal classifier ***si***, however, designates not just palms, but also other monocots—the Musaceae, Strelitziaceae, as well as members from the Poaceae. In addition, some Cecropiaceae and Mimosaceae are also given the attribute

si. The literal meaning of ***si*** is 'big surface', and it also means skin, bark, and covering. The word ***si*** (***sikï*** or ***sipë*** for plural) stands for a category and is put after the name (e.g., ***waima (kë) si,*** a *Euterpe* species). According to our informants, palms can always be put into the category ***si***. Even though the Yanomamï cannot tell exactly why the nominal classifier ***si*** is added to some plant species and not others, they say that it has to do with leaf form, not size. Thus leaf morphology appears to be the main criterion for the class ***si***. We conclude that especially plants with overall palm-like leaf arrangement (e.g., *Gynerium sagittatum* (Aubl.) P. Beauv., *Musa* spp., *Calathea* spp., *Cecropia* spp. and *Phenakospermum guyannense* (L.C. Richard) Endlich. ex Miquel) are put into this category. The more significant palm species, such as *Bactris gasipaes* Kunth and *Attalea maripa* (Aubl.) Mart. are not always accompanied by the nominal classifier when named as one plant. When several palms are referred to, the plural ***sikï*** or ***sipë*** seems to be required; hence, two or more *Bactris gasipaes* palms are called ***rasha sikï*** and their infructescences are called ***këkï***, which stands for a homogenous clustered object made up of individual units. With respect to the Musaceae and related plants, the Yanomamï point out the similarity in leaf morphology with palms. We further assume that the nominal classifier ***si*** describes the way palm leaves grow, out from a central trunk.

Spines as Characteristic Classifiers.—The spiny palms with lesser economic importance are also given the classifier ***mïsi***, which might either be an abbreviation for ***mïsïkï*** (spines) or a fused term derived from ***mïsïkï*** and ***si***, such as ***hoashi mïsi*** (*Bactris bidentula*) and ***mïsïkïri*** (*Desmoncus polyacanthos*).

Leaves as Use-based Classifiers.—Palms whose leaves are used regularly are often given the classifier ***henakï*** (leaves) and would not normally be referred to as ***si***. ***Henakï*** could be seen as a use-based category, with species from different families. Some species of the genus *Geonoma* are called and recognized by their leaves, for example, ***tharai henakï*** (*Geonoma baculifera* (Poit.) Kunth). The Yanomamï would therefore talk about the "***tharai*** leaves" rather then the ***tharai*** palm. The same is true for certain palms that produce edible fruits, such as ***eteweshi*** (*Mauritia flexuosa* L.f.).

Fruits and Hearts as Use-based Classifiers.—Unless specified, Yanomamï colloquial speech does not distinguish palm fruit from the whole plant. There are, however, few exceptions where there are words denoting particular fruits. For example, the endocarp of the fruit of *Mauritia flexuosa* is called ***kõhõmo***. They can provide detailed descriptions of palm fruits (***këki***), especially when a large palm infructescence has been located and is being reported to the others. For example, almost ripe fruits, which can be collected in a few days time are referred to as ***opi këkï***. Palm hearts are generally called ***kupu***.

Some Evidence for a Female Attribute to Palms.—A linguistic variant of some plant labels assigns gender, usually female, to the plant name; the suffix ***-ma*** or ***-na*** indicates female. Several such palm names include ***komishima*** from ***komishi, ya-watoama*** from ***yawatoa, pahana*** from ***paha*** and ***konoporima*** from ***konopo***.

PALM LABELS SHARED BY DIFFERENT LINGUISTIC SUBGROUPS

During our ethnobotanical study we found that even very distant Yanomamï communities use the same labels for economically important plants, but used different names for many other plants. Although we cannot provide a glottochronological analysis, cultivated species, certain wild taxa with high cultural significance, and palms more often have a phonetically similar label in the different language subgroups (Sanïma, Nïnam, Yanomam and Yanomamï) that otherwise show significant linguistic variations.

The ***warapa*** tree (Burseraceae), for example, is called ***warapa kohi*** in all language subgroups. The same is true for several palm species, such as *Bactris gasipaes* (***rasha***), *Euterpe oleracea* (***waima***) and *Socratea exorrhiza* (***manaka***). It is interesting to note that the indigenous name ***manaka*** (not to be confused with the Spanish name for *Euterpe* spp.) is also used for *S. exorrhiza* by the neighboring Carib tribes, such as the Mayongong (Henderson 1995).

We calculated the percentage of shared palm names relative to the number of palm species named by two distant Yanomamï groups. Comparative phonetic data from distant villages in Venezuela, such as Aratha of the upper Ocamo and Mokaritha of the Sierra Unturán, showed a high number of shared palm names (>85%) among fifteen palm species. This is quite remarkable because these two communities are separated by over 150 km air distance and they probably have not been in contact with each other for a long time. Comparing phonetic data on palm labels obtained by other investigators, we again found a very high number of shared palm names: 18 out of 19 names were identical with the distant Yanomamï groups south to the Serra da Neblinha region in Brazil (Knobloch 1970; Polykrates 1967). On the other hand, few equal palm names (5 out of 20 names) were found with the Shirianatheri in Brazil, where Anderson carried out his research (Anderson 1978). Comparing the data recently published by Milliken and Albert (1999), we again found little agreement in palm names: only 4 out of 17 names were shared among the ones that were recorded in the Demini region. There are, however, some names that have a common root. For example, the name of the small palm *Iriartella setigera* is ***yoroama si*** among the Venezuelan communities of the South and it is called ***horoma si*** among the adjacent Brazilian communities. Palm names reported by Anderson and Milliken are almost identical (15 out of 17 names), which is not surprising when taking into account the short distance between their study areas. Looking at migration patterns (Chagnon 1997; Valero 1984), it becomes obvious that the distant groups to the south of the Sierra Tapirapecó are related with the Shamatari groups in Venezuela, whereas the communities studied by Anderson and Milliken are probably more related to the eastern Yanomamï groups. The conserved ethnotaxonomy for palms might reveal a common, maybe not too distant origin of certain Yanomamï groups.

The question concerning why there is a certain amount of concordance of plant names between very distant groups is an interesting one. It is not clear how the names for palms originated and what the ages of the different names are. Palms are frequently used among the Yanomamï and they sometimes serve as sources for names given to humans. Once a person dies, the name becomes taboo and cannot be spoken out anymore. There are cases where related objects had to

be renamed because of the death of a person bearing its name. There are, however, no real data on that subject related to plant ethnotaxonomy.

PALMS IN MYTHOLOGY, CHANTS, AND RITUALS

Yanomamï mythology is complex and there are many tales; we only present the most important examples related to palms. The socioeconomic importance of *Bactris gasipaes* (***rasha***) among all the Yanomamï groups is shown by the substantial amount of folklore about the origin of this palm. According to a tale told by the Wawanaueteri (Zerries and Schuster 1974), a man called Koimawë was the first owner of the ***rasha*** palm (*B. gasipaes*). He fell in love with the daughter of deer (***haya***) and transformed himself (by making his legs very thin) into a deer, too. The deer people were cultivating the ***manaka*** palm (*Socratea exorrhiza*) and thought they were cultivating ***rasha***. It was Koimawë, who had transformed himself into deer, who tried to convince the deer people to cultivate proper ***rasha*** (Polykrates 1967). Becher (1974) recorded a tale where the evil spirit ***pore*** sent a bird to plant ***rasha*** palms. According to Knobloch (1970), the Yanomamï had a tale that said that it was the cultural hero Omawë who taught the Yanomamï to cultivate ***rasha*** palms. Helena Valero (1984) relates that the Yanomamï she lived with knew a tale about the origin of the ***rasha*** palm. According to them, the bird people celebrated a ***reahu*** feast and also invited a Yanomamï man. When the bird people turned into real birds, the Yanomamï took some of the ***rasha*** seeds with him. These are examples showing that the ancient people (***no patapï***), who later transformed themselves into animals, also ate palm fruits. Zerries and Schuster (1974) even go as far as to see a close relationship between the consumption of ***rasha*** fruits by some women and the overall transformation of people into animals.

The little ghosts called ***amahiri*** are said to live under the earth; apparently they are like tiny Yanomamï from earlier times. When asked about the nutrition of the ***amahiri*** our informants told us that they eat ***rasha***.

Recognition of a palm species is not always straightforward, as shown by a mythological tale which is known among the linguistic groups Yanomamï and Yanomam in southern Venezuela and Brazil, respectively (Wilbert and Simoneau 1990; Zerries and Schuster 1974): The ***hekura*** (spirit) Hayariwë, a deer who was Yanomamï, sent his daughter Hayarioma to collect the tasty yellow ***rasha*** fruits he had seen the other day. When Hayarioma got to the palm she realised that her father had mistaken the fruits because they were ***manaka*** (*Socratea exorrhiza*) fruits, which look similar, but taste more astringent and bitter. Hayarioma explored the forest and finally found real ***rasha*** fruits and brought them back to her father. Hayariwë tasted the fruits, took ***epena*** (a hallucinogenic snuff) and transformed himself into a deer.

Ayakorariwë, the spirit of the bird ***ayakorami,*** whose song is ***"aya aya koa koa"*** is said to be the creator and spiritual owner of ***rasha*** (see also Zerries and Schuster 1974). When the Yanomamï in Mokaritha plant ***rasha*** seeds or sprout cuttings they carry out a ritual whereby they imitate the song of the ***ayakoroami*** bird, whose alter ego or soul (***no uhutipë***) resembles that of the ***rasha*** palm. They believe that the ***rasha*** palms planted by women grow smaller and produce fruits

earlier than the palms planted by men. According to Becher (1974), certain groups in Brazil use the wood of *B. gasipaes* to make amulets. These rectangular amulets (***porehëwë***) are handed over to the young men after an initiation ritual by the chief. Because such amulets made of palm wood are not known to most of the Yanomamï, we conclude that they are an unusual feature of the southern Brazilian Yanomamï.

In his work *Poré/Perimbó,* Becher (1974) also writes about a ritual carried out by the women. If a woman's wish for a child does not become true she carves a little penis out of wood, inserts it in her vagina, and later wraps it in a ***rasha*** leaf. This package is then laid down at a ***rasha*** palm together with food sacrifices. Since such rituals are not known to the Yanomamï women in the area of our fieldwork and have not been reported by others, we assume that they might have been adopted from neighboring tribes. To our knowledge, the practice of food sacrifices is not generally known among the Yanomamï.

Many culturally important plants have animal spirits (***hêa***), which have the role of announcing the presence of the plant. These spirits are strongly associated with certain animals, most often little birds (Zerries and Schuster 1974). In Hasupïwei the animal spirit of the ***rasha*** palm is said to be a wasp called ***kopina napë*** whereas the spirit animal of the ***manaka*** palm is the humming bird ***tesho***. The ***paha*** palm has a ***hêa*** called ***toho*** (a little bird).

In addition to the ***hêa*** spirits, the ***hekura*** spirits, which are summoned by the shamans, play a role in palm mythology. The ***hekura katioriwë*** is the creator of the alter ego (or soul of the image) of the ***kareshi*** (*Attalea maripa*) palm. The palm ***hoko*** (*Oenocarpus bacaba*) plays a certain role as material for ornamental purposes (Figure 3). The adornments derived from the ***hoko*** palm might be generally associated with the ***hekura*** spirits because they are also used in the puberty initiation ritual of the girls and the ***hekura*** apparently like ***hoko sikï***. Women often wear fine stripes (***hoko sikï***) made of young ***hoko*** palm leaves in their ears or in a string bound around the arm. Interestingly, ***hoko sikï*** stands for several other kinds of auricular adornments not necessarily made of the ***hoko*** palm. ***Hoko sikï*** is also the name for the palm leaves of *O. bacaba,* which are used by the Yanomamï dancers during the presentations (***praïai***) before the feasts (Mattei-Muller, personal communication).[2]

Spirits known among the Yanomamï are usually anthropomorphic and sometimes have a kind of crown of light (similar to our halo). During the chanting (***hekuramou***) of a shaman (***shapori***) in a village of the lower Siapa in 1992, the first author observed that a ceremonial crown (***wathoshe***) made of *Leopoldinia piassaba* fibers was worn, which the shaman associated with luminous radiance. The songs (***amoa***) that are occasionally sung by the women during food collection, harvesting or hunting feasts are often associated with palms. Song topics include "the leaf of the ***manaka*** palm is big" and "how beautiful are the young leaves of the ***hoko*** palm." Also the men sing songs about palms, often related to mythological topics, for example, about the leaves of the ***hoko*** palm and how they turned into mountains.

Palms are also employed in sorcery. There is a magical *Cyperus* species called ***manaka këkï,*** which appears to be associated with the palm ***manaka kë si*** (*Socratea exorrhiza*). ***Manaka këkï*** is employed by men to harm women by making

FIGURE 3.—Yanomamï woman with ear ornaments (***hoko siki***) made of fresh leaflets of *Oenocarpus bacaba.*

them sterile, weak, and very thin (***manakapë***). This sorcery might eventually kill the women. The bulbous root of ***manaka këkï*** is mixed with little wooden pieces of the palms ***manaka*** (*S. exorrhiza*) or ***tharai*** (*Geonoma deversa*) and placed over the sleeping women. The mixture can also be added to a woman's food. Since the ***manaka*** palm is associated with the origin of women and fertility (Zerries and Schuster 1974) it is possible that there is a relationship between the black magic ***manaka*** and the ***manaka*** palm. Some men in Hasupïwei and Mokaritha claim that the ***manaka u,*** the sap of the palm, can cause the death of a woman when used in sorcery.

According to Yanomamï mythology, Omawë, the great mythological ancestor, once prepared a poisonous arrow point. He cut splinters from the ***yoroama*** palm (*Iriartella setigera*) wood and spread curare over it. When he laid the arrow point across the path it turned into a poisonous ant (Wilbert and Simoneau 1990). The ***yoroama*** palm appears to be associated with the origin of poisons in general and arrow poisons in particular (see section about *Iriartella*).

PALMS AS ANTHROPONYMS AND THEIR ROLE IN THE NAMING OF VILLAGES AND GEOGRAPHIC FEATURES

The Yanomamï express ideas about their environment within their language in many ways; for example, the names of plants and animals are frequently associated with each other and with their geomorphological environment. Human names among the Yanomamï are treated differently because they need to be kept

secret and not spoken out in presence of the person. We assume that this name taboo is associated with a threat of incest because it obliges the inhabitants of a village to call each other by their grade of relation or by a nickname.

The real names are often derived from plants, and frequently from palms. A few examples of man's names derived from palms are: Rashawë (*Bactris gasipaes*), Yeisiwë (*Oenocarpus* sp.), and Hayakawë (*Euterpe* sp.). Among the women the following names were found: Taraiyoma (*Geonoma* sp.), Rashayoma (*Bactris gasipaes*), Waima (*Euterpe* sp.) and Hokosikïyoma (*Oenocarpus bacaba*). A child's name, which is usually given in the third year, may be associated with the place where his or her placenta was hidden after its birth.[3] For example, if a child's placenta is hidden in the canopy of a palm, that might be reason enough to call the child after that palm.

Villages may be named after a plant species (or category) that grows abundantly nearby. Certain villages are given the names of palms: Yeitheri (*Attalea butyracea*), Rashawëtheri and Rashakamitheri (*Bactris gasipaes*) and Konoporipïweitheri (*Iriartea deltoidea*). The reason for naming a village after a plant species (or a category) usually relates to the abundance of the given plant. Similarly, rivers are sometimes named after palms, such as the Yeisipïwei (***yei*** = *Attalea butyracea*). The abundant presence of *Astrocaryum chambira and A. gynacanthum* in the Río Mavaca area is indicated by the fact that the southern Yanomamï (Shamatari groups) call this river Pahana u, which literally means *A. chambira*- or *A. gynacanthum*-river.

MANAGEMENT OF PALMS: EXTINCTION VERSUS SUSTAINABILITY

It is difficult to make generalizations about the sustainability of Yanomamï palm use, because there are big variations in the management of palm resources between communities.

Non-destructive Uses of Palm Trees.—Philips (1993) points out that most preferred palm fruits are difficult to harvest without destroying the trees; yet, the Yanomamï are usually careful not to destroy the fruit-producing palms and have developed certain strategies to collect palm fruits in a sustainable fashion. The collection of the infructescence of *B. gasipaes* (***rasha***), for example, is complicated because the palm is big and the stem is densely spiny. In order to climb up this palm the men employ two kinds of x-shaped scaffolds (***karaki***), each one made of two stems bound together in the middle. This technique is not easy and many young Yanomamï men from villages close to the missions of Ocamo, Mavaca, and Platanal have not mastered it. We observed that instead of climbing the trees, they throw objects at the fruits to make them fall.

We never observed the destruction of a *Mauritia flexuosa* (***eteweshi***) palm because the fruits are collected from the ground or the infructescence is harvested by climbing up the palm. *M. flexuosa* grows in swamps often in dense stands. The Yanomamï occasionally visit *M. flexuosa* stands in order to collect the fruits. According to the headman of the Hasupïweitheri, some *M. flexuosa* populations have human origin; he believes that the seeds were brought there by his ancestors. The consumption of the fruits of small palms, such as *Hyospathe elegans, Geonoma* spp.

and *Bactris simplicifrons* is occasional. These fruits are collected without destroying the palms, mostly by the women and children, who eat them raw.

Destructive Uses of Palm Trees.—It further seems that normally *Attalea* species are not cut down. We observed, however, that *A. butyraceae* were sometimes cut because of the edible larvae that dwell on the decomposing starch of this palm. The rotting trunks and stems can yield up to 4 kg of beetle larvae or grubs per palm.

In contrast to *Attalea,* the species of *Euterpe* and *Astrocaryum* are often cut down. In the case of *Astrocaryum,* the fruits are difficult to harvest and the heart can be eaten when the palm is destroyed.

To make a good bow, the men with superior status in the community cut the young *B. gasipaes* down to use its wood. Because this palm is cultivated for food, we think only high-status individuals who have big garden plots with many palms can afford it. The men with lower status have to find alternative palm wood or obtain it by trade. Once the palm is cut down, the rotting trunk produces an additional protein source, in the form of beetle larvae.

When other food is lacking, the Yanomamï do not hesitate to cut down palms to eat the hearts and to generate a food source for larvae. Vinci (1961) wrote that there were almost no palms around the Shiriana village because the community had cut them all down to eat the hearts. To fell palms in order to harvest hearts and to provide fodder for Coleoptera larvae (e.g., *Rhynchophorus palmarum*) is a common and important habit among the Yanomamï men. This method also has been described among other ethnic groups in the Amazon (Gumilla 1791; Lévi-Strauss 1950). The attraction of Coleoptera larvae in rotting palm wood among the Yanomamï has been described by Chagnon (1968). We observed that the consumption of grubs and beetles obtained from different rotting palms can make up an important part of the overall protein intake. These larvae might contain about 60% protein, 5% unsaturated fatty acids, as well as important nutritional factors like thiamine, zinc, copper, calcium and riboflavin (Duke and Vasquez 1994). We recorded ten palm species with edible beetle larvae that had been attracted to the rotting wood. In the case of *Oenocarpus, Bactris,* and *Euterpe* species the intention of cutting the palms is usually to foster the supply of different larvae that dwell in rotting palm wood. The benefit of cutting down *Euterpe* species is quite big because both the fruits and the heart can be eaten immediately and the rotting wood will eventually yield edible larvae.

We also wondered whether the extensive collection of *Geonoma* and *Bactris simplicifrons* leaves for thatching the communal houses has an impact on the ecology of these palms. Since as many as hundred thousands of leaves are required to thatch a house (Milliken and Albert 1997; Zerries and Schuster 1974), the destructive collection could eradicate whole populations. From what we could observe the leaves are collected individually by the women and children who generally avoid stem collection. It seems that populations might partially recover from extensive collecting. The leaves of ***miyôma*** (*Bactris simplicifrons*) are valued because of their durability. These leaves are even sometimes taken off the old houses to be reused in the construction of the new house, especially if the new living area does not supply these palms.

DYNAMICS OF PALM USE AND IMPACT OF ACCULTURATION

The fact that most Yanomamï groups are semi-nomadic and move their communal house every four to eight years ensures a more sustainable use of palm resources and gives palm populations the chance to recover. Dwelling construction seems to be partly adapted to regional variations of the flora and different cultural demands. Fuentes (1979) provided an impressive example of the dynamics of plant use among the Yanomamï. He describes how the Waputhawëtheri did not find enough *Geonoma* spp. to thatch the house, so that they finally decided to use *Attalea* spp. Because the huge leaves of *Attalea maripa* and *A. butyraceae* were too heavy for the traditional construction the Waputawëtheri were obliged to change the architecture of the roof. In the end, they built a communal house with a roof construction similar to their neighbors, the Yekuana. In a recent visit to the Torithatheri the first author noticed exactly the same phenomenon. The newly built roundhouse, with a diameter of about 85 m, was large enough to provide a landing facility for helicopters. Due to the size of this village there were not enough *Geonoma* spp. for roofing and they decided to employ *Attalea butyracea* leaves. In the Sierra Parima, the traditional roundhouses are protected by outer palisades to add an obstacle to enemies in case of raids (Smole 1976). *Socratea exorrhiza* cannot be sustainably harvested for palisade construction because splitting it destoys the tree. Fuerst (1967) described the use of *S. exorrhiza* planks in the construction of walls at Toototobi. Peters (1998) reports the use of slats from palms (probably *S. exorrhiza*) to make a five-foot vertical wall around the perimeter of the communal house. We observed the use of slats for palisades only in the villages close to the Salesian mission stations Ocamo, Mavaca, and Platanal. These slats, mainly obtained from *S. exorrhiza,* were used to make houses whose form differed from traditional Yanomamï dwellings. The increase of individual private property has imposed the demand for closed dwellings with doors that can be locked. In fact, this is now a very strong factor in the motivation to change traditional architecture.

Acculturation has already induced many changes in the use of palms and will finally result in a changing cultural context of many species. Many palms are now either overexploited because some Yanomamï groups have become sedentary or not exploited anymore because new materials from the mission stations can be obtained. The introduction of zinc and plastic for roofing purposes is an example of the latter. Because the management of wild plant resources within the Yanomamï groups does not seem to be sustainable (see also Finkers 1986; Fuentes 1979), we consider the possibility that more palms have been cut within the last fifty years due to the introduction of machetes and axes. Many palms that are now cut down easily with machetes and axes were not cut at all in the past.[4] The economy of palm usage as such is complex and would certainly need further investigation.

LIST OF PALMS, CULTURAL IMPORTANCE, AND USES

Table 1 summarizes all the palm species discussed in this article. The Yanomamï names are written according to the standard linguistic form used in Ven-

TABLE 1.—Palms recorded among the Yanomamï in Venezuela.

Genus/species (coll. no.)	Yanomamï name	Synonym	Area	Cultural significance
Attalea butyracea (FS 815)	***yei***		O, P, U	4
Astrocaryum aculeatum (JGP 4)	***akiato***		O, P	3
Astrocaryum chambira (JGP1)	***paha***		O, P, U	3
Astrocaryum gynacanthum (JG 133)	***moshihawë***	***moshohawë***	O, P, U	3
Astrocaryum jauari (FS 347)	***moshoha***	***moshoko***	O, P	3
Asterogyne sp. (JGP 11)	***shoko***		O, P	1
Attalea maripa (FS 809)	***kareshi***		O, P, U	4
Bactris aff. *balanophora* (FS 421)	***yohôma***		P	2–3
Bactris gasipaes (FS 814)	***rasha***		O, P, U	4
Bactris maraja (FS 484, JGP 10)	***komorawë***		P, U	3
Bactris simplicifrons (FS 686)	***miyôma***	***mïsïkïri***	O, P	4
Bactris bidentula (JGP 2; JGP 12)	***hoashi mïsi***	***hoashi mosi***	O	2
Bactris sp. 2 (JG179)	***shitipa***		O, P, U	1
Bactris sp. 3 (JG 203)	***hoshekï***		P, U	2
Desmoncus polyacanthos (FS 669)	***mïsïkïri***	***mïsïkïrima***	O, P, U	1
Desmoncus sp. (JGP5)	***mashihire***		P, U	2
Euterpe catinga (FS 715)	***hayakawë***		O, P	3
Euterpe oleracea (JGP 3)	***waima***		O, P, U	4
Euterpe precatoria (FS 797)	***waima***		P, U	4
Geonoma baculifera (FS 802)	***komishi***	***komishïma***	O, P	4
Geonoma deversa (JG 103)	***tharai***	***thaitai***	P, U	4
Geonoma maxima (FS 659)	***thomithomi***		O, P	2
Geonoma sp. (JG176)	***komishi***	***komishïma***	O	4
Hyospathe elegans (JG 88)	***maharawë***		U	2
Iriartea deltoidea (FS 676)	***konopo***	***konoporima***	O, P, U	3
Iriartella setigera (FS 710)	***yoroama***		O, P, U	3
Leopoldinia piassaba (FS 511)	***raea***		P, U	2
Manicaria saccifera (FS 355)	***yawatoa***		O, U	3
Mauritia carana (FS 384)	***moyenarïmi***		P, U	4
Mauritia flexuosa (FS 304)	***eteweshi***		O, P, U	4
Mauritiella aculeata (FS 590)	***torea***		P	3
Mauritiella armata (JGP 7)	***kohere***	***kohare***	P	2
Mauritiella sp. (JGP 8)	***marueti***		P	2
Oenocarpus bacaba (FS 707)	***hoko***		O, P, U	4
Oenocarpus bataua (FS 353)	***haprua***	***hapruawë***	O, P, U	4
Oenocarpus sp. (JGP 6)	***sharapë***		P, U	3
Socratea exorrhiza (FS 821)	***manaka***		O, P, U	4

Coll. no. (collection number): JGP numbers are based on photographs/drawings and do not represent herbarium specimens, whereas JG and FS are herbarium specimens. Area of report: O (Ocamo/Manaviche), P (Platanal/river upwards), U (Sierra Unturán). The cultural significance is an artificial scale constructed from the relative frequency and number of economic and mythological uses of the species: 1 is a palm that is used very occasionally for no more than one use; 2 is a palm not very frequently found or used with more than one use; 3 is a palm frequently found and employed with at least two uses; 4 is a palm with at least three uses and a very high frequency of usage.

ezuela (Mattei-Muller, personal communication).[2] In addition, the table contains data about the area of field observations (origin of reports), as well as an artificial scale of the overall importance of the species.

The following generic list provides information about the context of use of the palm genera. Methods of preparation of palm species and meanings of names

are explained. The information presented, if not stated otherwise, has been collected during our fieldwork.

Asterogyne (Uses: construction–leaves). The leaves of an unidentified *Asterogyne* species (***shoko kesi***) were used for the fabrication of a whistle to attract birds.

Astrocaryum (Uses: food–heart, fruits; construction–wood, fruit, leaves, thorns). Provisional shelters (***yano***) built during treks are sometimes covered with the spiny *A. aculeatum* G. Mey (***akiato kë si***) leaves for protection from enemies, evil spirits, and wild animals. The spines also are used to remove skin parasites. Although the heart can be eaten, it is not favored. The fruits are only occasionally eaten. The fruits of *A. chambira* Burret (***paha kë si***) are eaten raw. The endosperm of ripening fruits is consumed as a liquid when young or later as a nut. The fibrous stem wood of this species is sometimes used by the men for the fabrication of the fighting club (***himo***), the usage of which has been described elsewhere (Chagnon 1968). Because *A. chambira* is common in primary forests, its wood is readily available, and except for *Bactris gasipaes* and *Oenocarpus* sp., is most often used in the fabrication of the robust and durable bow. The pericarp of the fruits is used by children to make spinning tops, which are also called ***paha*** like the palm. The women make toys for little children from the tough endocarp. *A. chambira* is common in the upper Rio Mavaca and Sierra Unturán region as well as along the Rio Ocamo.

The fruits of *A. gynacanthum* Mart. (***moshihawë kë si***) are eaten roasted and the slightly sweet heart is eaten cooked like a vegetable (Figure 4). The somewhat smaller orange-reddish fruits are prepared for food like *A. chambira*. We collected a voucher specimen in the Sierra Unturán, where this species is frequent.

The palm heart of *A. jauari* (***moshôa kë si***) is edible, the spines are removed from the wood so that it can be used in the construction of the houses (***yahi***).

Attalea (Uses: food–fruits; seed, larvae; construction–leaves, spathes). The endocarp of the fruit of *A. butyraceae* (Mutis ex L.f.) Wess. Boer (***yei kë si***) is eaten in great amounts (see Figure 5). The seed also is opened and the inner part is eaten. The leaves are sometimes used in the roundhouse to make provisional walls between the compartments. The leaves are more and more used to thatch the communal houses due to overexploitation of the leaves of *Geonoma* spp. normally used. With the young leaves of *A. butyraceae* the ceremonial crowns (***watoshe***) of new shamans are fabricated. The rachises of the leaves are used to make little arrows (***kareshi masikï***) for the boys. *A. butyraceae* also serves for the construction of the cotton spindle (***ruhu masi***) and provides little sticks to perforate the earlobes of children. Edible beetle larvae (***oõu okï***) live in its rotting wood.

The mesocarp of ripe fruits of *A. maripa* (Aubl.) Mart. (***kareshi kë si***) is eaten in great amounts between July and October and is therefore an important food source during the rainy season. The fallen fruits are collected and the kernels are left in water for up to several days, boiled and then opened to eat the small seeds. ***Kareshi*** heart is occasionally eaten on treks. The *A. maripa* leaves (***masiko***) are used in the ***shapono*** to raise little walls for protection against the sun or from the neighbors. Sometimes, the leaves are used to thatch the roofs of smaller houses.

FIGURE 4.—Infructescence of *Astrocaryum gynacanthum* (***moshihawë***), which is roasted and cooked before consumption.

The petioles of the leaves are used by boys to make little arrows (***kareshi masiki***) and they also serve in the making of spindles for cotton (***ruhu masi***) and as the little sticks for perforating the earlobes of children. The spathes are folded and sewn together at each end to provide a container for food or trash.

Bactris (Uses: food–fruits, heart, larvae; construction–wood, leaves, fruits). The mesocarp of the fruit of *Bactris* aff. *balanophora* Spruce (***yohôma***) is eaten raw, mostly by women and children. Boys use the leaf petiole to make little arrows, which they use to hunt small birds.

The spiny-trunked palm *B. gasipaes* Kunth (***rasha kë si***) with hard dark wood has in many cases lost the capacity to produce fertile seeds and is reproduced by planting sprout cuttings (Sauer 1950). The fruits are greatly appreciated in all the

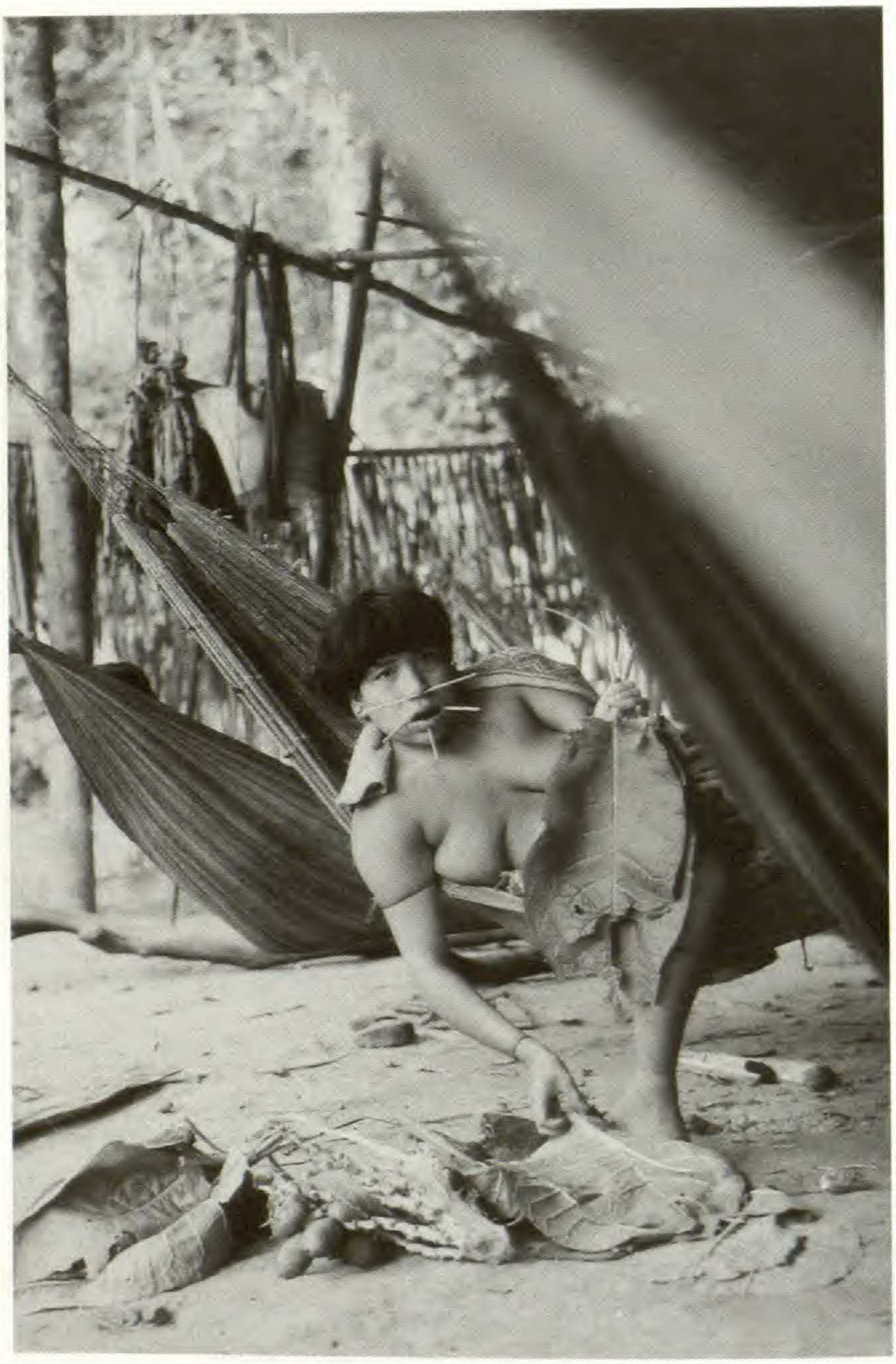

FIGURE 5.—Yanomamï woman preparing tobacco leaves, the fruits of *Attalea* sp. on the floor serve as occasional snack.

Yanomamï communities (Figure 6). The mesocarp is consumed because it has a pleasant taste and possesses a high nutritional value. According to Popenoe and Jimenez (1921), the cooked fruits contain 40.9% carbohydrates, 6.7% fatty acids, 2.8% proteins and 48.8% water. The nutritional value is more than twice that of plantains (*Musa* spp.). This species does not appear to occur wild but is cultivated in swidden clearings throughout the Yanomamï territory. Reports about wild palms (Zerries and Schuster 1974) probably just concern old garden populations (Figure 7). This palm is usually grown in the older part of the garden, which is called the anus of the plot (***posi kë thëka***). Each palm might produce up to 120 kg of fruit per season. From January until March, when *B. gasipaes* produces most of its infructescences, the Yanomamï often invite neighboring communities to celebrate the ***reahu*** feast. The men prepare the ***rasha*** fruits for the guests. This feast

FIGURE 6.—Infructescence of *Bactris gasipaes* (***rasha***) ready for transportation.

is associated with funerary celebrations of related groups and strengthens the alliances between communities. Although ***rasha*** fruits play a certain role during ***reahu,*** it is not true that ***reahu*** is the feast of the ***rasha*** fruits as proposed earlier (Eibl-Eibesfeldt 1972).

We could distinguish at least four cultivated forms of *B. gasipaes*: 1) ***rasha auaurimï*** (also ***rasha yoararomï***), which has greenish-yellow epicarps. This cultivated form can also be eaten raw because it has a nice sweetish taste; 2) ***rasha tapïtapïrimï*** with yellow fruits; 3) ***rasha wakëwakërimï,*** with dark reddish fruits; and 4) ***rasha ahu mopë,*** an apocarpic form with green-reddish fruits. Each palm produces two main harvests, the main one during December to March and another smaller one in August. When the palms get old and do not produce good infructescences anymore, they are cut. The sweetish and soft heart is then eaten. The women make adornments for their ear lobes with the young leaves by tearing them into fine strips. The men make their bows with the wood. According to them, the wood of *B. gasipaes* is best suited for the construction of the bow (***hato***). The poisonous arrow points (***husu kë namo***) are made of this wood, although the preferred wood seems to be from *Iriartella setigera.* The women use a stick (***rasha husi***), usually made out of an old bow as a tool for garden work and also for self-defense. In the old trunks and stems the Yanomamï always look for edible beetle larvae. The trunk of *B. gasipaes* is habitat for tasty larvae called ***oõu okï***.

The leaves of the small palm *B. simplicifrons* Mart. (***miyôma kë si***) are used to wrap all kinds of objects, including small animals, and fruits. In the Siapa area the roofs of the communal houses (***shapono***) are said to be made entirely out of *B. simplicifrons* leaves. The leaves of ***miyôma*** sometimes bear spines, but occur

FIGURE 7.—Cultivated *Bactris gasipaes* palm of a garden plot in Irokai.

more frequently unarmed (Stauffer and Briceño 2000). The palm grows in large populations in nonflooded places in rain forests and is frequent to the south of the Sierra Unturán. The small fruits are occasionally eaten during long walks, mainly by women and children. In order to store the fresh snuff mass made of the seeds of *Anadenanthera peregrina* (Fabaceae) the men use ***miyôma*** leaves. The leaves are also used to make a kind of funnel for the preparation of curare. It seems that the leaves of *B. simplicifrons* are also most suited to store diverse products employed in sorcery. Women often wrap up the placenta of a new born child in the leaves of *B. simplicifrons* in order to make a package, which is hidden. In the past, the little fruits were used to make collars.

The heart and fruits of *Bactris bidentula* (***hoashi kë mosi***) are edible, the endocarp is eaten raw, and the wood is sometimes used to make the Yanomamï bow. ***Hoashi (kë) mosi*** can be translated as "palm of the penis of the capuchin

monkey (*Cebus nigrittatus*)." The palm is also cut to provide fodder for edible beetle larvae.

Shitipa kë si (unidentified) is a common *Bactris* species without particular use. The Yanomamï of the upper Ocamo think that it is a kind of degenerated *B. gasipaes* (***rasha***) palm because it does not produce edible fruits. According to our informants in Ocamo the wood can be used to make bows. The palm is cut to provide fodder for edible beetle larvae. Another unidentified species is ***hoshekï,*** which produces fruits that are eaten raw. The fruits of *B. maraja* Mart. (***komorawë***) are suitable for eating, although they are not particularly tasty.

Desmoncus (Uses: food–fruits). According to the women, the fruits of an unidentified *Desmoncus* species (***mashihire kë si***) are edible, though not very tasty. These fruits were occasionally eaten by the women and children of Mokaritha, mainly during walks in the forests. No uses are recorded for *D. polyacanthos* Mart. (***mïsïkïri kë si***).

Euterpe (Uses: food–fruits, heart, larvae; construction–leaves). *E. catinga* Wallace (***hayakawë***) is somewhat smaller and not as common as *E. precatoria* Mart. (***waima kë si***). The heart, leaves and fruits of both palms are used in the same way. The fruits are soaked in water and then extracted to prepare an aromatic and sweet purple drink. Some Yanomamï groups of the upper Orinoquito use the pigment obtained from the purple fruits to make face and body paint. The heart of this palm is appreciated because it is sweetish and soft when cooked. The leaves are used in the construction of the communal house at the end of the roof that faces the open space in the middle. The leaflets hang down from the end of the roof to ensure that no rain enters the inside of the roof. During the ***reahu*** feast the ***waima*** leaves are halved and used in dances. The rotting stem wood provides fodder for edible beetle larvae.

Because *E. oleracea* Mart. (***waima kë si***) is not normally found in the Venezuelan Amazon, we assume that it has been introduced by the Brazilian Yanomamï to some neighboring groups. *E. oleracea* produces many stems, each one growing a heart, so this palm is appreciated as a source of edible hearts. It is not present along the middle and upper Orinoco but has been recorded from the lower eastern Sierra Parima.

Geonoma (Uses: food–fruits; construction–leaves). The abundant palm *Geonoma baculifera* (Poit.) Kunth (***komishi kë si***) grows in huge populations in the forests of the upper Orinoco, especially to the north, along the Orinoquito, Manaviche and Ocamo rivers. The leaves are considered ideal for wrapping up smaller pieces of food to cook them in the fire. ***Komishi*** leaves resist the heat of the charcoal and are therefore often used to prepare food. The leaves also are often used to thatch the roof of the traditional communal house. In addition, these leaves are used to make a funnel to separate the bone powder from the bone pieces, which have not yet been pulverized properly. The bones of the dead need to be crushed and pulverized since the Yanomamï funerary ritual demands the ashes (including bone powder) to be eaten by the relatives. This *Geonoma* species is a typical ***mïshikï*** (material for thatching or weaving).

The leaves of *G. deversa* (Poit.) Kunth (***tharai kë si***) are used frequently in the construction of the roofs of the communal houses. The palm is more abundant to the north of the upper Orinoco and it is also often used to wrap up food to roast in the coals. During long walks, the fruits are occasionally eaten by women and children.

The leaves of *G. maxima* (Poit.) Kunth (***thomïthomï kë si***) are used in the same manner as the ones from *G. deversa*. The name ***thomïthomï*** is associated with the picure (*Dasyprocta* spp.), which is called ***thomï***.

Hyospathe (Uses: food–fruits, heart; construction–leaves). The fruits of *H. elegans* Mart. (***maharawë***) are eaten raw, especially by the women and children. The small heart is also edible. Despite the fact that this palm is known by the other communities, we could only record its use in Mokaritha. As with the leaves of *Geonoma* spp., those of this palm are used to wrap up little objects. When there is no other material the leaves of ***maharawë*** are also used to thatch the roof of the communal house. This palm is quite abundant towards the Sierra Unturán and in the southern Sierra Parima, and according to our informants, also along the Río Ejército.

Iriartea (Uses: food–heart; construction–stilt roots, spathe; medicine–leaves). The heart of *Iriartea deltoidea* Ruiz and Pav. (***konopo kë si***) can be eaten, but it is not tasty. In the olden days the Yanomamï made their hammocks out of the stilt roots of *I. deltoidea*. They took a long stilt root, cleaned the spines from it, and beat it with a stone until the fibers came out. The fibers were left attached at the ends to provide a hammock. (They do not weave the fibers together; therefore, it is sometimes easy to fall through the fibers!) The spathe, which can be found on the ground, is used to make small bags, which are called skin of the ***konopo*** (***konoposi***) or ***karaha***. These bags are used by the men to store feathers, monkey skins and other ornamental utensils (***paushi***). In the myth of the big deluge (***motu pata***), the Yanomamï tried to save their lives by hanging their hammocks in the ***konopo*** palms. The young sprouting leaves are used against the bites of the poisonous ant ***shihô*** (*Euponera* sp.). The sprouts are squeezed and put onto the spot that hurts.

Iriartella (Uses: construction–wood, leaves). The wood of the small palm *Iriartella setigera* (Mart.) H. Wendl. (***yoroama kë si***) is used to make the poisonous arrow points (***husu kë namo***). Interestingly, the name for blowgun is also ***yoroama***. It is noteworthy that blowguns are not used among the central Yanomamï. According to our informants, the wood of *I. setigera* is particularly suited to make the poisonous arrow points because it already contains a lethal power. In the mythology the acquisition of curare is related to a blowgun (***yoroama***) and it is possible that the Yanomamï men therefore prefer ***yoroama*** wood for that purpose. Boys make little arrows (***ruhu masikï***) from the leaf rachis.

Leopoldinia (Uses: food–fruits; construction–leaves). The fruits of *Leopoldinia piassaba* Wallace (***raea kë si***) are sometimes eaten raw, especially when other food is scarce. Around the mission in Ocamo, we could observe that the leaves of *L. piassaba* were used to thatch the non-traditional houses. The fibers of the stem can

be used for the fabrication of the ceremonial crown (***watoshe***) for the initiation of a new shaman.

Manicaria (Uses: food–fruits, larvae; construction–leaves). The immature seeds of *Manicaria saccifera* Gaertn. (***yawatoa kë si***) are eaten raw. The leaves are used to cover objects and to provide protection from dust. Rotting stems are always investigated for edible beetle larvae. Because this palm is more frequent in the upper Mavaca the resident groups of that area more often use the fruits as food. The rotting wood provides fodder for edible beetle larvae.

Mauritia (Uses: food–fruits, larvae; construction–leaves). The mesocarp of the fruit of *Mauritia carana* Wallace (***moyenarïmi kë si***) is edible and different in taste from *M. flexuosa* L.f. (***eteweshi kë si***). The pulp of the fruit is reddish and less sour than ***eteweshi***. The rotting wood provides fodder for edible beetle larvae.

The mesocarp of the ripe (***okoroshi***) fruits of *M. flexuosa* is eaten raw. The infructescence is cut and left in the water for some days before collection. The pulp is also gathered to make a broth with water. Since there are many *M. flexuosa* populations (*morichales*) in the Venezuelan Amazon, the fruits are quite frequently consumed. Edible beetle larvae also live in the rotting wood of this starchy palm. The petiole of the leaf is used by boys to make small arrows. The split petioles are used for weaving simple baskets (***yorehi*** type) that are employed to store food and detoxify cooked ***wapu*** fruits (*Clathrotropis* spp.), which are soaked in water. The women use the young leaves to make ear ornaments (***hoko siki***).

Mauritiella (Uses: food–fruits; construction–wood, leaves). The fruits of *Mauritiella armata* (Mart.) Burret (***kohere kë si***) are eaten infrequently. The petiole of the leaf is used by boys to make little arrows. The women use the young leaves to make ear ornaments (***hoko siki***).

The fruits of *M. aculeata* (Kunth) Burret (***torea kë si***) are edible. With the wood of this palm the men fabricate a certain type of arrow point (***ãthãri***) to hunt big birds and monkeys. The young leaves are seldom used to make ear ornaments.

Oenocarpus (Uses: food–fruits, larvae; construction–leaves, wood, petioles). The fruits of *Oenocarpus bacaba* Mart. (***hoko kë masi***) are important in the Yanomamï diet, especially because they fruit primarily during the rainy season. From the mesocarp of the fruit a thick broth is obtained, which is diluted in water to prepare a drink. The stems of *O. bacaba* are used in the construction of the communal house and its wood is occasionally employed in the fabrication of bows. The young leaves are torn into fine strips by women and girls to make earlobe ornaments, which are called ***hoko sikï***. These ornaments are worn during the initiation ritual of the women. ***Hoko siki*** literally means ***hoko*** palms and denotes all the ornaments made out of palm leaves. Men use half leaves of *O. bacaba* during feasts, where they are lifted up and moved down during the presentation dances (***praïai***). Woven screens are made from the leaves as protection from the sun or for privacy in the communal house. In the rotting wood live beetle larvae (***potimani***) which are eaten.

The infructescence of *O. bataua* Mart. (***haprua kë si***) is frequently harvested by the men. The fruits are cooked in water, the epicarp is discarded, and the

FIGURE 8.—Stilt root of *Socratea exorrhiza* (***manaka***), formerly used in the fabrication of hammocks.

mesocarp is prepared as a drink. The ripe mesocarp is also macerated in hot water for one or two hours. The resulting soup is consumed raw or cooked. The leaves are used to make provisional shelters within the communal house as well as walls for protection. For this purpose the leaves are woven together. The women make a kind of fan (***shuhema***) with the small leaves. It is used to fan the coals when making fire and also to sweep the floor. The leaves are used to wrap up the dead for transportation. The split petioles are used for weaving simple baskets that are employed (lined with leaves) to store food and to detoxify the cooked ***wapu*** fruits (*Clathrotropis* spp.), which are soaked in water for several days.

An unidentified species (***sharapë***) also produces edible fruits. According to our informants it is similar to *O. bataua* but not as frequent.

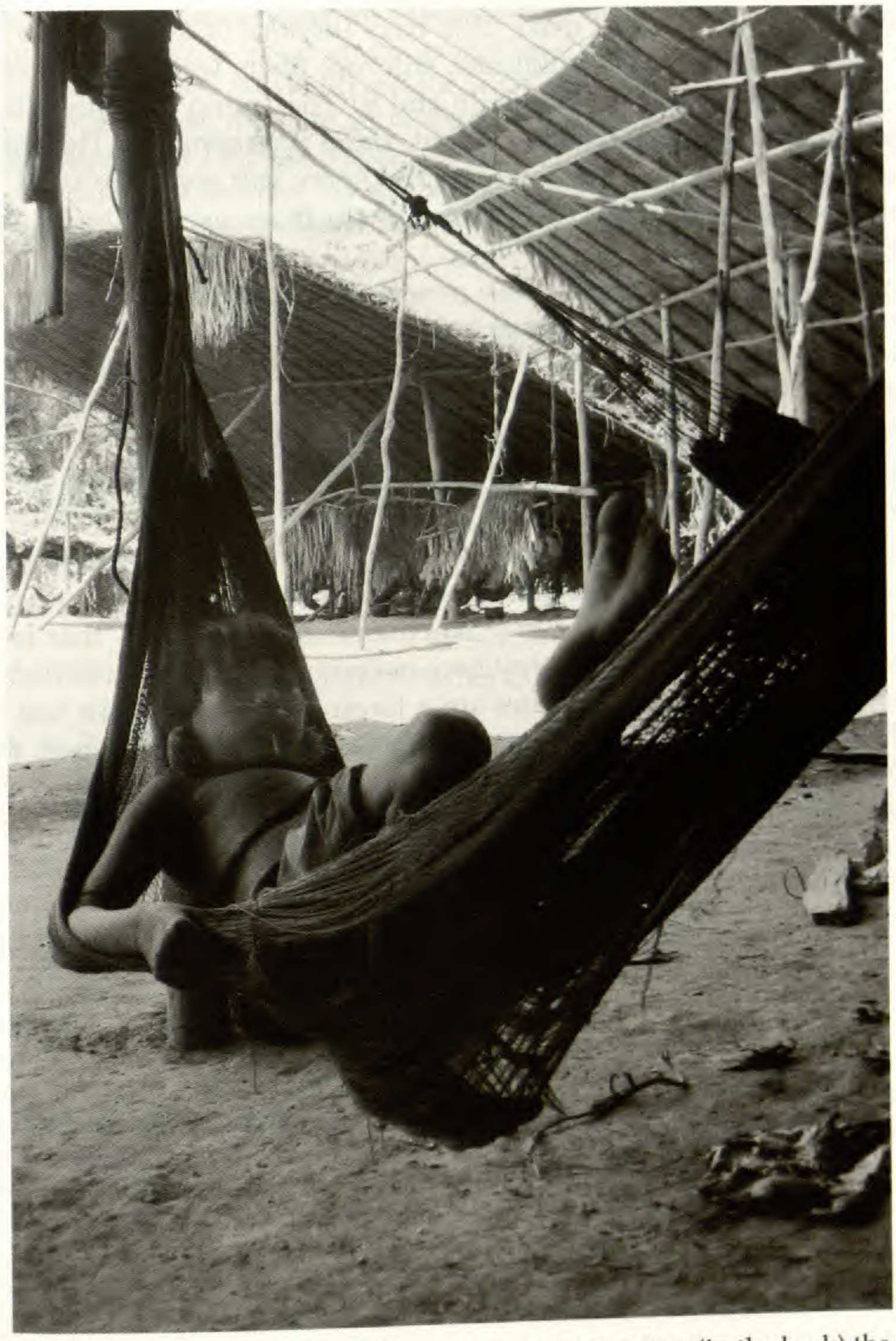

FIGURE 9.—Girl in hammock in the village Hasupïwei showing (in the back) the structure of the roundhouse with palm thatched roofs.

Socratea (Uses: construction–wood, spathe; medicine–young leaves). The stems of *Socratea exorrhiza* (Mart.) H. Wendl. (***manaka kë si***) are usually employed in the construction of the communal house. The mythological importance of ***manaka*** has already been described above. The stem wood is occasionally used in the fabrication of bows. According to Valero (1984), the men use sanded and pointed pieces of the stem as wooden rods in duels. The spathe of the inflorescence is sown together at the ends and used to press out fruits to make juice. The fruits are put into the bag-like press and squeezed until the juice gathers in the bag.

The spathe is further used to make little bags (***karaha*** or ***konoposi***) to carry all sorts of objects. As with *Iriartea deltoidea,* stilt root fibers were left attached at the ends to provide a hammock (Figures 8 and 9) The young sprouting leaves are used against the bites of the poisonous ant, ***shihô*** (*Euponera* sp.). The sprouts are squeezed and put onto the hurting spot. The spiny stilt roots are used to open, grind and rasp the ***tana*** fruits (*Genipa* spp.), which are used as body paint (Fuentes 1979).

DISCUSSION

Anderson (1978) states that the Yanomamï (Shirianatheri) exploit palms to a far lesser degree than do other South American tribes. We think that this conclusion might have been derived partly because of the limited duration of his fieldwork. Anderson has correctly pointed out, however, that regional differences in the distribution of palm populations force the indigenous groups to look for substitutes, and that in certain areas palms have been overexploited and are no longer available. While it is true that some Yanomamï dwell in areas that lack palm diversity, this does not mean that they have necessarily lost their knowledge about palms and their uses. The Yanomamï are a forest people and make use of many of the plant species available. Given the abundance of palms in the area, this plant family provides an ideal resource for a semi-nomadic people. The importance of palms as food is already shown by the fact that most palms produce edible fruits or hearts. In addition, the starchy wood of more than ten palms serves as fodder for beetle larvae, which are eaten in great amounts by all the Yanomamï groups visited. In this study we have shown that the Yanomamï generally employ more then half of the palm species present in the area as food, construction material, magic and medicine.

NOTES

[1] VEN: Herbario Nacional de Venezuela; NY: Herbarium of the New York Botanical Garden, Bronx; US: National Herbarium of the United States of America, Smithsonian Institution, Washington DC; MYF: Herbario V.M. Ovalles de la Facultad de Farmacia, UCV, Caracas; TVAF: Herbario J.A. Steyermark del MARNR, Pto. Ayacucho; PORT: Herbario de la UNELLEZ, Guanare; MER: Herbario de la Facultad de Ciencias Forestales (ULA), Mérida; GUYN: Herbario del Jardín Botánico de Ciudad Bolívar, Ciudad Bolívar; CAR: Herbario de la Fundación La Salle de Ciencias Naturales, Caracas.

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[3] Taped interview with Helena Valero in her home near Ocamo, August, 28,1998.

[4] Taped interview with Helena Valero in her home near Ocamo, August, 28,1998.

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